GEOGRAPHIC SCHOOL BULLETINS

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JUSTIN LOCKE

Sugar cane makes Christmas candy for Puerto Rican youngsters (page 128)

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► Nepal's King Seeks Progress

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► Christmas Trees

Merry Christmas and a Happy New Year to Geographic School Bulletins subscribers! Next issue will be dated January 6, 1958.

earth some 81 times more. You learned from your first step that the moon has only one-sixth of earth's gravity. Back home the circus strong man could lift 500 pounds. You realize that here he'd hoist a ton and a half. You flex your own muscles; with little effort you might jump over a house, were there one. Yet moon's gravity is enough to tug at earth's oceans, causing surging tides.

Approaching a small crater, you climb its rim with easy leaps. But be careful not to dislodge your breathing apparatus. Death would come in seconds. Long ago, men thought the earth's own atmosphere enveloped this brown, silent, lifeless orb. Millions have seen a "man" here wearing a giant's features. Romans, Greeks, Chaldeans, and Egyptians agreed that his lonely banishment resulted from misconduct on earth. Now his features are sprawled on this landscape, but too distantly for definition.

Before men climbed the ladder of the sky with efficient lenses they thought dark patches on the moon were bodies of water. They gave these areas Latin names meaning Sea of Serenity, Lake of Dreams, Ocean of Storms, Sea of Clouds. Actually these smooth regions are plains. Many scientists think they are covered with lava. A recent theory suggests they are dust perhaps a mile or two deep.

But now the plains are beneath your feet and you can see for yourself. Using the crater Copernicus as a check point, you set out to study lunar geography.

LICK OBSERVATORY

THE MOON, magnified by a 36-inch telescope, displays these prominent features:

1—Copernicus, a crater 56 miles in diameter (see close-up, page 125). Astronomers have named craters for scientists, moon mountains for earth's ranges.

2—The Apennines. To the right of this range lies the Sea of Serenity.

3—Aristoteles, a crater 55 miles wide. Below and to the right is the Lake of Dreams.

4—Plato, a 60-mile-wide crater. Halfway between Plato and Aristoteles is the Alpine Valley, a faint line across the mountains.

5—Kepler, 22 miles wide. To the left of this crater spreads the Ocean of Storms. The white mark above it is Aristarchus, the moon's brightest crater.

6—Tycho, the 54-mile-wide crater from which streaks radiate. Dark mass above it is the Sea of Clouds. Huge Clavius, just below Tycho, cannot be distinguished in these light conditions.

7—The Doerfel Mountains lie on the moon's horizon, causing an unevenness barely distinguishable against the inky sky.

8—Theophilus is a crater 18,000 feet deep, 64 miles across.

PAINTING BY CHARLES BITTINGER, N.A.

MAN ON THE MOON

Picture yourself the first human to stand on the moon. Never mind when or how. But remember that every satellite that is blasted into orbit puts the day and the method a little nearer.

YOU never felt such silence before. Your ears hunger for a sound to break it just as your eyes search for some sort of color—a leaf, a bird's wing, a sunset cloud. But brown desolation, unchanged by wind or water, lifeless as strewn lava, stretches everywhere.

You grope into the strangeness with a step measured for three feet and arrive, amazed, 18 feet away. What power, you wonder, might an ordinary cannon have in this world of no air and scant gravity? Its shot would travel right around the moon, soundlessly. It would traverse a brown desolation of flatlands, yawning craters, jagged cliffs, and savage mountains soaring up to 30,000 feet.

You are 240,000 miles from home, almost 10 times the distance around the earth's equator. Now your earth-home is visible steeply overhead—a blue globe in a black sky playing "moon" to the moon itself, but four times wider than the full moon you watched back home. Skies are clear over earth, and faint continents appear.

The round desolation you're visiting would weigh 81 quintillion tons, the

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sunlight even in the darkest shadows. But on the moon, shadows stream as black as funeral crepe. Changelessness broods over everything.

Yet violent meteors do bruise and lacerate the moon. Seeing the infinite number of pockmarks, you glance upward in furtive fear, suddenly aware that an object might strike from black space without warning. Exploring the battered surface, you may resolve a long controversy. Did meteors or volcanic action gouge the moon's 32,000 visible craters? If the latter, what a spectacle—myriads of eruptions raging from craters, some more than 100 miles across their infernos. You think of earth's Vesuvius and Mount Etna. They would have been mere firecrackers compared to moon's ancient eruptions. But many scientists say no. There is no atmosphere to burn away meteors that might plunge toward the moon. So they would smash home, full sized, causing even the largest of these high-rimmed craters—just as stones dropped into wet clay leave dents with high walls.

Crater Aristarchus yawns 29 miles of diameter, is the moon's brightest spot. You tiptoe on the circular rim and learn what may cause its gleam. Is it white pumice, as some scientists believe? But a vaster crater awaits—150-mile-wide Clavius, raising walls of 12,000 feet. Smallest pits in its floor are two to three miles in diameter. You look down, down, and across, reeling at the immensity as from a first view of earth's Grand Canyon. You stare upward to mountains beyond the rim, razoring into the black sky at 20,000 feet above the crater's floor. Could you reach the crater bottom you would not see those mountains. The surface of the moon curves too much.

Now you may strike off for true discovery. You grope across the rim that earthlings can see and enter that other side of the moon, always hidden from earth's viewers. Scientists think the unknown face may about duplicate the features we see. But perhaps you will discover mountains that tower above the highest visible peaks, craters that yawn far deeper and wider than Clavius.—S.H.

Brought close, Copernicus looks like the dent of a soft-nosed bullet. To its right lies the crater of Eratosthenes.
LICK OBSERVATORY

MAP OF THE HEAVENS

A year in preparation, and released as an insert in the December, 1957, issue of the National Geographic Magazine, The Society's Map of the Heavens becomes available to schools at a time when the advent of artificial satellites has stimulated man's interest in the skies to an all-time high.

New legions are joining the world's oldest fraternity—the stargazers. But new and old alike can derive profit and enjoyment from the National Geographic Society's beautiful and complete directory of the universe. Nearly 2,000 stars, down to the 6th magnitude, shine from a background of after-dusk blue. Drawings of the moon, planets, and fanciful constellation figures embellish the 42- by 28-inch sheet. On the back appear 24 star charts.

75¢ on paper; $1.50 on fabric. Order from National Geographic Society, Dept. GSB 711, Wash. 6, D. C.

PALOMAR OBSERVATORY

A Mount Palomar telescope probes moon's upper segment. This California observatory produced the huge Sky Atlas under joint sponsorship of the National Geographic Society. The unprecedented photomapping project expanded knowledge of the universe 25 times.

Copernicus, figure 1 on page 123, appears faintly in the lower left hand corner of this photograph, right. Slightly above and an inch to its right is deep Eratosthenes—and the foothills of the Apennines. This range curves upward into darkness. Above it, at far right, high peaks of the Caucasus catch the sun. Above them sprawl the Alps, tumbling left to the dark circle of Plato.

From some craters rays seem to radiate across the moon's face. Tycho and Copernicus have the most noticeable of these streaks, reaching hundreds of miles across the lunar plains. Exploring the moon, you may learn what these are. Great faults appear among the mountain ranges—larger, perhaps, than any on earth. For some 75 miles the Straight Wall looms 500 to 1,500 feet high, a barrier almost arrow-straight. From a crater rim you can see the beginning of another straight slash, the Alpine Valley. It drowses in earthlight, the reflected glow of sunlight on earth's surface. You realize that to viewers on earth this is a "half moon"—in other words, only half its face is in full sunlight. Yet the earthlight is about 60 times stronger than full moonlight on earth. You could read this Bulletin easily by earthlight. No wonder children point out the "old moon sitting on the new moon's lap." They can see the entire moon, faintly illuminated by earthlight, inside the bright, slender crescent that is lit by the sun.

The moon you ride travels an elliptical orbit around the earth every four weeks (27.3 days) rotating only once on its own axis during the tour. Thus it keeps the same face towards earth at all times. No one knows what the other side of the moon looks like. With the earth, the moon also circles the sun which bathes all sides equally with light—without cloud protection. Any spot on the moon's surface endures two weeks of sizzling heat (about 212 degrees F.) followed by two weeks of night with temperature plunging to some 243 degrees below zero.

You could not survive here without recreating earth's temperature and pressure in a space suit. Even protected physically, you find the landscape almost unbearably melancholy—and garish. Stars blaze day and night in unblinking brightness. There is no atmosphere to make them twinkle. Earth's blanket of air reflects some

craftsmen. Mountain-climbing Sherpas lead flocks to Himalayan pastures. Gurkha regiments gained fame under British and Indian flags.

India has been the tiny nation's greatest friend, lending economic, technical, and political aid. This powerful neighbor recently completed the first road leading out of Nepal. American technicians have helped the Nepalese develop natural resources. But today it is Red China that seems to play the leading role, though the King and his advisors cling to neutrality.

In trust and affection, the people look to their progressive new monarch, said to be a descendant of the god Vishnu. In small

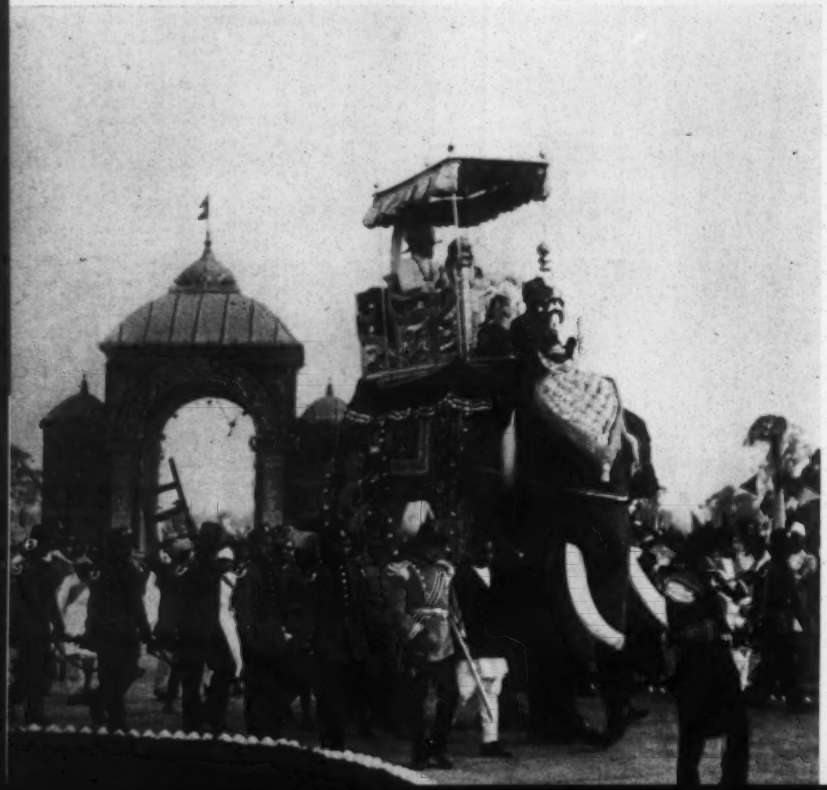
MARC RIBOUD

towns such as Patan, above, ancient customs still prevail when the King visits. Women and children watch from balconies, but men stand on the streets so as not to be above their King as the royal car drives past. Yet the King goes out of his way to mix with the people in the street.

Nepal joined the United Nations in 1955. In that same year, for the first time, tourists were invited to visit the mysterious land. Lowell Thomas was one of three U. S. envoys at the coronation. He filmed the ceremony for a forthcoming Cinerama release. He asked E. Thomas Gilliard, frequent contributor to the *National Geographic Magazine*, to join him. So the magazine published, in July, 1957, an exclusive account of the spectacle, illustrated in color.—K.C.

New Ideas Crowd Nepal's King

First Americans Watch Coronation Pageantry at Katmandu



MARC RIBOUD

LIKE a small boy racing to keep step with a parade, Asia's mountain kingdom of Nepal is doing its best to catch up with the 20th century. Steeped in medieval ways, the monarchy is scrutinizing itself with cool dispassion. Political leaders challenge the divine right of their ruler. King Mahendra himself questions his traditionally unquestionable authority. Yet when the occasion warrants, pageantry and pomp still sway the 8,500,000 people of Nepal as they have for centuries.

King Mahendra, world's only Hindu monarch, was crowned amid lavish Asian splendor in May, 1955. Mounted on Nepal's tallest elephant, freshly painted for the coronation, the royal howdah carried the King and his Queen through pulsating crowds in the capital of Katmandu, left. Priests' helpers waved ceremonial peacock fans, above, symbols of the King's authority. Peasants on foot and mounted on ponies, some of them carrying gleaming Buddhist images, streamed into the city from all over the realm. Here, indeed, was a Shangri-La, decked as for an Oriental Mardi Gras in the shadow of the towering Himalayas.

Remote Nepal (GSB March 18, 1957), no larger than the State of Wisconsin, has enormous problems—political, economic, and geographic. One barrier is lack of education. Only two out of a hundred Nepalese can read and write. Their country stands athwart high passes between India and communist-controlled Tibet. Eight different languages are spoken within this area. The Newar tribe includes skilled

MARC RIBOUD

sprouts on four of every 10 farm acres, supports over 50 percent of farm workers. Tobacco, next most important, grows on over 20,000 small holdings, mostly in east-central mountain areas.

Cabezona (big head) pineapples often reach 10 pounds in the southwestern Palmarejo District, though elsewhere the fruit ripens to normal size. Pineapple raising boomed enormously after World War II. Hundreds of millions of pounds channel from island canneries into ice cream, pies, and fruit cups on the mainland, bringing the raisers more money per acre than sugar cane. Coffee was the most valuable crop a half century ago, but declined in competition with Brazil's vast output. The lashing whip of late summer hurricanes wreaks further damage to the Puerto Rican coffeegrowers.

When Columbus discovered the island on November 19, 1493 (his second voyage), green curtains of trees and jungle hid the landscapes. Ponce de Leon's stout-muscled adventurers hacked along to found, in 1508, the first white settlement near the present capital of San Juan. Later settlers leveled the jungles off. But Puerto Rico now blooms with some 3,000 kinds of plants, some imported from other tropical lands.

Coconut palms bend to coastal winds. Other palms provide material for mattings and baskets, some thatched roofs, many straw hats. Royal poinciana trees flame with red blossoms. Air sweetens after rains with odors of jasmine. Eyes linger on poinsettia bushes and crimson and purple bougainvillaea vines.

But scant wildlife exists within such a dense population. Outdoor trampers can stop worrying—the snakes are nonpoisonous. Puerto Rican children drift to sleep under the lull of coqúi, a tree frog with a birdlike note. Dwellers along the

Puerto Rico RACE TOWARD PROSPERITY

Photographs by Justin Locke

HERE'S how school lets out in the Cabo Rojo salt field area of Puerto Rico, America's tropic isle. Like schools everywhere, you'll say—but there's a difference. The month is December. Teachers stand bare-armed in cotton dresses, and boys' shirts are open-necked. School doors, too, fly open across an entire wall.

Warm weather lingers the year round in Puerto Rico, attracting winter-weary thousands from the "continent," as Puerto Ricans refer to the United States mainland. Travelers find it easy to visit this self-governing commonwealth. They come to bask in Puerto Rican sun, to marvel on landscapes of indelible colors—deep green mountains, blue-splashed ocean—to enjoy imprints of old Spain. They find differences startling so near to home.

Puerto Rico lies 110 miles long and some 35 miles wide, the easternmost of the Greater Antilles, fourth largest of the islands that, together with Lesser Antilles, skip from Florida's tip to South America's coast. It is larger than Rhode Island and Delaware combined, but every square mile is far more crowded. Were the continental United States populated as densely, it would swarm with about 1,900,000,000 inhabitants. Every 5¾ minutes, some Puerto Rican family receives *feliciataciones*—congratulations. A new baby is born.

Long ago, nature scarred this region of the earth. Just off the Atlantic shore, Milwaukee Depth plunges more than 30,000 feet below sea level. Near by, a nearly submerged mountain range forms the Antilles. Thus Puerto Rico wears a spine of jagged peaks along its center, soaring more than 4,000 feet. Level land is scarce except on the coastal plains and in narrow inland valleys. Greatest natural resource is the volcanic soil, enriched in some areas with decayed limestone and sand. The sticky soil hugs hillsides tightly when cloudbursts come. Farmers treasure every inch, and till more than 80 percent of the total land area.

Silvery strokes of the machete harvest feathery-green sugar cane on coastal lands of the north, east, and south. Foundation of the island economy, sugar cane

From Evergreen Forest to Festive Hearth

TALL evergreens wear a peculiar dignity in any season. Add lights and tinsel and the majesty changes to magic—uniquely expressing the joy and hope of Christmas.

How did the Christmas tree custom originate? Some think from the tree worship of ancient German tribes. Martin Luther, 16th century churchman, reputedly originated the lighted Christmas tree, using candles to capture the celestial lights of a Christmas Eve sky he had watched.

What Kind of Christmas Tree?

Every family has its own tastes in Christmas trees, but five species comprise 81 percent of the number produced —Douglas fir, balsam fir, eastern red cedar, black spruce, and Scotch pine. Authorities name no best all-round species.

When selecting a tree, look for a full, symmetrical shape, enough strength to support lights and ornaments, a healthy green color and fragrant smell.

Evergreens dry quickly indoors. Many people set them in water or damp sand. Even so, keep the tree away from fireplaces, radiators, and television sets. Avoid combustible decorations and frayed wiring for tree lights. Don't install electrical toys (trains, for example) beneath the tree.

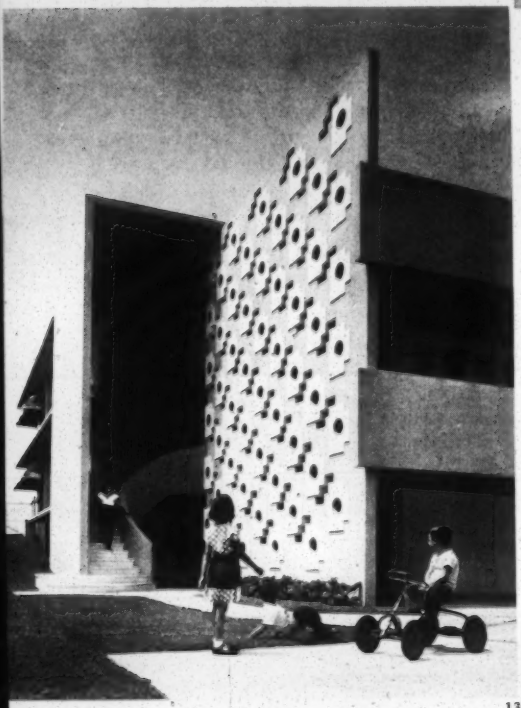
Hessian soldiers trimmed Christmas trees in America during the Revolutionary War. And, later, German Prince Albert of Saxe-Coburg-Gotha introduced England to the Christmas tree after his marriage to Queen Victoria. Scandinavians have celebrated Christmas around the fragrant green emblems for 150 years. Parisians bought 35,000 Christmas trees in 1890.

By then, Americans had enjoyed trimmed trees for some half a century. Last year an estimated 39,000,000 trees retailed at about $52,000,000—a tree for about nine of every 10 families. This means that Christmas tree production has matured from random chopping to a well-ordered industry. For example, the tree-hauling tractors, below, are bringing in the harvest (about 3,000 trees on each dray) of Halvorson Trees, Inc., near Duluth, Minnesota. Halvorson's cut

UMI

northern Atlantic and southern Caribbean coasts watch sea and shore birds hover over blue waters. They see boats pound in with catches of kingfish, tuna, barracuda, Spanish mackerel, mullet, and huge, spiny West Indian lobsters.

Frequent quick-falling showers fail to dampen islanders' fun. Sociability, in Spanish and English, reigns at baseball games, boxing matches, cockfights, horse races, basketball games, and dances with steps and words harking back to Spanish custom. Spain dominated the island for 400 years, until it passed to American control after the Spanish-American War. Now the island, rich with the culture of two nations, is governed by its own constitution. Inhabitants are United States citizens, many irrepressibly proud of what the United States did for Puerto Rico. They have seen living conditions magically improve on a sizable scale. Squalor, which long sickened the island, is gradually disappearing. Hundreds of manufactures sprang up under "Operation Bootstrap."



From factories come chemicals, cement, glass, cigars, candies, electrical appliances, rum, straw hats, pottery, cardboard containers, and textiles. As employment spreads, everyone eats more barbecued pig, chicken with rice, stewed kid, and crab meat.

Mayagüez, west coast seaport, is memorable for its women's needlework, a high-ranking industry. Dexterous fingers stitch blouses and table linens, do French hand rolling, bullion, and other fancy work. Needlework is a home industry. In many rural areas, earnings from needlework often form a family's sole income during off seasons in sugar. See "Growing Pains Beset Puerto Rico" in the April, 1951, *National Geographic*.—S.H.

SLEEK DWELLING near San Juan shows new trends. But in the northeast, palm-thatched settlements still remain, above.

THE TIMES (LONDON)

ALL LONDON rejoiced at this Christmas gift from Oslo—a tree in Trafalgar Square

last year totaled about 1,500,000 black spruce. Only the tops are cut; the tree stands to grow another top for another year. These perfect miniatures often are sprayed with white, silver, green, or pink paint for use in rooms too small for floor trees.

Grower associations within the tree industry advise their members of market conditions, grades of trees, and new seedings. Conservationists once feared that Christmas harvests would deplete evergreen resources. For a while, President Theodore Roosevelt would not allow a Christmas tree in the White House. Now federal foresters say that scientific Christmas tree marketing is good for woodlands, often freeing land for growth of lumber, saw logs, or pulpwood.

Big municipal Christmas trees, specially cut, rise in city parks and plazas as the holiday nears. In Washington, D. C., one stands on the ellipse south of the White House—the Nation's tree. Another adorns Rockefeller Plaza in New York City (GSB Dec. 17, 1956). But the Northgate community, a shopping center north of Seattle, Washington, perhaps had the tallest on record—a 25-ton 212-foot Douglas fir, brought in from the Naches forest 70 miles away for a dressing of 3,500 colored light bulbs. A helicopter served to trim the top.

How different from the tree of your forefathers. They probably used candles, with the constant fear of fire. On the boughs they hung strings of popcorn and tufts of cotton to simulate snow. Apples lent color, as did long beads of cranberries, crepe ornaments, and paper flowers.

But they, too, knew the warm excitement of trimming the tree, the final effort of securing an angel or a star on the highest point. Then the lights go on—and all the spirit of Christmas seems to glow mystically around the world.—